

Sub 2
2
3
said sprinkler having a K-factor of about 25 and a minimum design flowing pressure of about 15 pounds per square inch, and less than about 40 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

[Please amend claim 3, as follows:]

--3. (Amended) The early suppression fast response pendent-type fire protection sprinkler of claim 2, 36, 37 or 38, wherein said reentrant slots extend inwardly along reentrant slot centerlines, and each of said reentrant slots has a first width transverse to its reentrant slot centerline in a region of said peripheral edge and a second slot width transverse to its reentrant slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, said second width being greater than said first width.--

Please amend claim 6, as follows:

Sub 2
2
3
--6. (Amended) The early suppression fast response pendent-type fire protection sprinkler of claim 3, wherein said reentrant slot centerlines [extends] extend radially outward from said deflector axis.--

[Please amend claim 7, as follows:]

--7. (Twice Amended) The early suppression fast response pendent-type fire protection sprinkler of claim 2, 36, 37, or 38, [1, 22, 23 or 24, further comprising a deflector, and] wherein said sprinkler is suited for installation with said deflector disposed up to 18 inches below a ceiling.--

[Please amend claim 8, as follows:]

--8. (Twice Amended) The early suppression fast response pendent-type fire protection sprinkler of claim 2, 36, 37 or 38, wherein said deflector has a thickness measured from said first surface in the direction of fluid flow equal to or greater than about 0.06 inch.--

[Please amend claim 9, as follows:]

Sub
D1
--9. (Amended) The early suppression fast response pendent-type fire protection sprinkler of claim 2, 36, 37, or 38, wherein said reentrant slots comprise a plurality of reentrant slots, said plurality of reentrant slots comprising at least a first type of reentrant slots and a second type of reentrant slots,

reentrant slots of said first type extending from said first surface through said deflector with the slot openings at an outer peripheral edge of said deflector body, each of said reentrant slots of said first type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a first type length,

reentrant slots of said second type extending through said deflector from said first surface, with the slot openings at said peripheral edge of said deflector body, each of said reentrant slots of said second type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a second type length, and

the innermost portions of said reentrant slots of said first type extending inwardly toward said deflector axis to be no further outward from said deflector axis than the outermost surface of said apex element.--

Please amend claim 21, as follows:

B
--21. (Twice Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage, having a maximum storage height of 25 feet in a storage area having a maximum ceiling height of 30 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 15 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 22, as follows:]

--22. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of

about 25 and a minimum design flowing pressure of about 20 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 23, as follows:]

--23. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 and a minimum design flowing pressure of about 25 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 24, as follows:]

--24. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 and a minimum design flowing pressure of about 40 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 25, as follows:]

--25. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 20 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 26, as follows:]

--26. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage

having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 25 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 27, as follows:]

--27. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 40 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 28, as follows:]

--28. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 25 feet in a storage area having a maximum ceiling height of 30 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 15 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 29, as follows:]

--29. (Amend) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 20 pounds per square inch at the most hydraulically remote sprinkler.--

[Please amend claim 30, as follows:]

--30. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage

having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 25 pounds per square inch at the most hydraulically remote sprinkler.--

Please amend claim 31, as follows:

--31. (Amended) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 40 pounds per square inch at the most hydraulically remote sprinkler.--

Please amend claim 32, as follows:

--32. (Amended) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 25 feet in a storage area having a maximum ceiling height of 30 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 15 pounds per square inch at the most hydraulically remote sprinkler.--

Please amend claim 33, as follows:

--33. (Amended) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 20 pounds per square inch at the most hydraulically remote sprinkler.--

Please amend claim 34, as follows:

--34. (Amended) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no

open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 25 pounds per square inch at the most hydraulically remote sprinkler.--

Please amend claim 35, as follows:

--35. (Amended) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 40 pounds per square inch at the most hydraulically remote sprinkler.--

Please add the following new claims:

--36. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 and a minimum design flowing pressure of about 20 pounds per square inch, and less than about 45 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--37. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 and a

minimum design flowing pressure of about 25 pounds per square inch, and less than about 50 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--38. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 and a minimum design flowing pressure of about 40 pounds per square inch, and less than about 65 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--39. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 25 feet in a storage area having a maximum ceiling height of 30 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 15 pounds per square inch, and less than

about 40 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

5016
a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

40134
--40. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 20 pounds per square inch, and less than about 45 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--41. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 25 pounds per square inch, and less than

about 50 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--42. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a K-factor of about 25 or more and a minimum design flowing pressure of about 40 pounds per square inch, and less than about 65 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--43. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 39, 40, 41, or 42, wherein said reentrant slots extend inwardly along reentrant slot centerlines, and each of said reentrant slots has a first width transverse to its reentrant slot centerline in a region of said peripheral edge and a second slot width transverse to its reentrant slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, said second width being greater than said first width.--

Sub
--44. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 43, further comprising an apex element and wherein said deflector is mounted to said apex element and wherein an innermost portion of each of said reentrant slots extends inwardly toward said deflector axis to be no further outward from said deflector axis than an outermost surface of said apex element.--

Ant By
--45. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 44, wherein said innermost portions of said reentrant slots extend inwardly toward said deflector axis to underlie said apex element, relative to fluid flow direction from said outlet.--

--46. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 43, wherein said reentrant slot centerlines extend radially outward from said deflector axis.--

--47. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 39, 40, 41, or 42, wherein said sprinkler is suited for installation with said deflector disposed up to 18 inches below a ceiling.--

--48. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 39, 40, 41, or 42, wherein said deflector has a thickness measured from said first surface in the direction of fluid flow equal to or greater than about 0.06 inch.--

--49. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 39, 40, 41, or 42, wherein said reentrant slots comprise a plurality of reentrant slots, said plurality of reentrant slots comprising at least a first type of reentrant slots and a second type of reentrant slots,

reentrant slots of said first type extending from said first surface through said deflector with the slot openings at an outer peripheral edge of said deflector body, each of said reentrant slots of said first type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a first type length,

reentrant slots of said second type extending through said deflector from said first surface, with the slot openings at said peripheral edge of said deflector body, each of said reentrant slots of said second type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a second type length, and

the innermost portions of said reentrant slots of said first type extending inwardly toward said deflector axis to be no further outward from said deflector axis than the outermost surface of said apex element.--

Sub 51
--50. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein:

Can't By
each of said reentrant slots of said first type has a first width transverse to its slot centerline in a region of said peripheral edge and a second width transverse to its slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, the second said width of said first type slots being greater than the first said width of said first type slots, and

each of said reentrant slots of said second type has a first width transverse to its slot centerline in a region of said peripheral edge and a second width transverse to its slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, the second said width of said second type slots being greater than the first said width of said second type slots.--

--51. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein said first type length is equal to or greater than said second type length.--

--52. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 51, wherein said reentrant slot centerlines of said reentrant slots of said first type extend substantially radially outward from said deflector axis.--

--53. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 52, wherein said reentrant slot centerlines of said reentrant slots of said second type extend substantially radially outward from said deflector axis.--

--54. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein said reentrant slots of said first type comprise at least two pairs of generally opposing reentrant slots.--

--55. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein said reentrant slots of said second type comprise at least two pairs of generally opposing reentrant slots.--

--56. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein said first type length of said reentrant slots of said first type is substantially the same.--

Pub
9/17
--57. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein said second type length of said reentrant slots of said second type is substantially the same.--

cont
By
--58. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein said reentrant slots of said first type define reentrant portions having an elongated shape.--

--59. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein said reentrant slots of said second type define reentrant portions having a pear-shape.--

--60. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 49, wherein a reentrant slot of said second type is located between reentrant slots of said first type.--

--61. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 25 feet in a storage area having a maximum ceiling height of 30 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 15 pounds per square inch, and less than about 40 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

Sub
D12

--62. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 20 pounds per square inch, and less than about 45 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

done 1/3/94

--63. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 25 pounds per square inch, and less than about 50 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--64. (New) An early suppression fast response pendent-type fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to

Sub
P17
protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 40 pounds per square inch, and less than about 65 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

Case 1 B4
a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--65. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 61, 62, 63, or 64, wherein said reentrant slots extend inwardly along reentrant slot centerlines, and each of said reentrant slots has a first width transverse to its reentrant slot centerline in a region of said peripheral edge and a second slot width transverse to its reentrant slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, said second width being greater than said first width.--

--66. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 65, further comprising an apex element and wherein said deflector is mounted to said apex element and wherein an innermost portion of each of said reentrant slots extends inwardly toward said deflector axis to be no further outward from said deflector axis than an outermost surface of said apex element.--

--67. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 66, wherein said innermost portions of said reentrant slots extend inwardly toward said deflector axis to underlie said apex element, relative to fluid flow direction from said outlet.--

--68. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 65, wherein said reentrant slot centerlines extend radially outward from said deflector axis.--

--69. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 61, 62, 63, or 64, wherein said sprinkler is suited for installation with said deflector disposed up to 18 inches below a ceiling.--

--70. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 61, 62, 63, or 64, wherein said deflector has a thickness measured from said first surface in the direction of fluid flow equal to or greater than about 0.06 inch.--

--71. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 61, 62, 63, or 64, wherein said reentrant slots comprise a plurality of reentrant slots, said plurality of reentrant slots comprising at least a first type of reentrant slots and a second type of reentrant slots,

reentrant slots of said first type extending from said first surface through said deflector with the slot openings at an outer peripheral edge of said deflector body, each of said reentrant slots of said first type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a first type length,

reentrant slots of said second type extending through said deflector from said first surface, with the slot openings at said peripheral edge of said deflector body, each of said reentrant slots of said second type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a second type length, and

the innermost portions of said reentrant slots of said first type extending inwardly toward said deflector axis to be no further outward from said deflector axis than the outermost surface of said apex element.--

--72. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein:

each of said reentrant slots of said first type has a first width transverse to its slot centerline in a region of said peripheral edge and a second width transverse to its slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, the second said width of said first type slots being greater than the first said width of said first type slots, and

each of said reentrant slots of said second type has a first width transverse to its slot centerline in a region of said peripheral edge and a second width transverse to its slot centerline

in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, the second said width of said second type slots being greater than the first said width of said second type slots.--

--73. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein said first type length is equal to or greater than said second type length.--

--74. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 73, wherein said reentrant slot centerlines of said reentrant slots of said first type extend substantially radially outward from said deflector axis.--

--75. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 74, wherein said reentrant slot centerlines of said reentrant slots of said second type extend substantially radially outward from said deflector axis.--

--76. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein said reentrant slots of said first type comprise at least two pairs of generally opposing reentrant slots.--

--77. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein said reentrant slots of said second type comprise at least two pairs of generally opposing reentrant slots.--

--78. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein said first type length of said reentrant slots of said first type is substantially the same.--

--79. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein said second type length of said reentrant slots of said second type is substantially the same.--

--80. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein said reentrant slots of said first type define reentrant portions having an elongated shape.--

--81. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein said reentrant slots of said second type define reentrant portions having a pear-shape.--

Ad 2/17
--82. (New) The early suppression fast response pendent-type fire protection sprinkler of claim 71, wherein a reentrant slot of said second type is located between reentrant slots of said first type.--

an-1 By
--83. (New) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 25 feet in a storage area having a maximum ceiling height of 30 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 15 pounds per square inch, and less than about 40 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--84. (New) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 30 feet in a storage area having a maximum ceiling height of 35 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 20 pounds per square inch, and less than about 45 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots

extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

Sub
D/C
Cen: 134

--85. (New) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 35 feet in a storage area having a maximum ceiling height of 40 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 25 pounds per square inch, and less than about 50 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

--86. (New) An early suppression fast response fire protection sprinkler suitable for use in accordance with one or more of NFPA 13, NFPA 231 and NFPA 231C, to protect single row rack storage, double row rack storage and multiple row rack storage having a maximum storage height of 40 feet in a storage area having a maximum ceiling height of 45 feet, with no open containers and no solid shelves, said sprinkler having a minimum design flowing pressure of about 40 pounds per square inch, and less than about 65 pounds per square inch, at the most hydraulically remote sprinkler, and further comprising:

a sprinkler body defining an orifice and an outlet for delivering a flow of fluid from a source, and

a deflector mounted with a first surface opposed to flow of fluid from the outlet, said deflector defining at least two reentrant slots disposed in opposition about a deflector axis, said reentrant slots extending from said first surface through said deflector, and said reentrant slots extending from slot openings at an outer peripheral edge of said deflector inwardly from said peripheral edge toward said deflector axis.--

Sub P17
--87. (New) The early suppression fast response fire protection sprinkler of claim 83, 84, 85, or 86, wherein said reentrant slots extend inwardly along reentrant slot centerlines, and each of said reentrant slots has a first width transverse to its reentrant slot centerline in a region of said peripheral edge and a second slot width transverse to its reentrant slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, said second width being greater than said first width.--

em. 1. By
--88. (New) The early suppression fast response fire protection sprinkler of claim 87, further comprising an apex element and wherein said deflector is mounted to said apex element and wherein an innermost portion of each of said reentrant slots extends inwardly toward said deflector axis to be no further outward from said deflector axis than an outermost surface of said apex element.--

--89. (New) The early suppression fast response fire protection sprinkler of claim 88, wherein said innermost portions of said reentrant slots extend inwardly toward said deflector axis to underlie said apex element, relative to fluid flow direction from said outlet.--

--90. (New) The early suppression fast response fire protection sprinkler of claim 87, wherein said reentrant slot centerlines extend radially outward from said deflector axis.--

--91. (New) The early suppression fast response fire protection sprinkler of claim 83, 84, 85, or 86, wherein said sprinkler is suited for installation with said deflector disposed up to 18 inches below a ceiling.--

--92. (New) The early suppression fast response fire protection sprinkler of claim 83, 84, 85, or 86, wherein said deflector has a thickness measured from said first surface in the direction of fluid flow equal to or greater than about 0.06 inch.--

--93. (New) The early suppression fast response fire protection sprinkler of claim 83, 84, 85, or 86, wherein said reentrant slots comprise a plurality of reentrant slots, said plurality of reentrant slots comprising at least a first type of reentrant slots and a second type of reentrant slots,

reentrant slots of said first type extending from said first surface through said deflector with the slot openings at an outer peripheral edge of said deflector body, each of said reentrant slots of said first type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a first type length,

Sub
P. 17

reentrant slots of said second type extending through said deflector from said first surface, with the slot openings at said peripheral edge of said deflector body, each of said reentrant slots of said second type extending inwardly from said peripheral edge, along the reentrant slot centerlines, generally toward said deflector axis, to a second type length, and the innermost portions of said reentrant slots of said first type extending inwardly toward said deflector axis to be no further outward from said deflector axis than the outermost surface of said apex element.--

each 1 B4

--94. (New) The early suppression fast response fire protection sprinkler of claim 93, wherein:

each of said reentrant slots of said first type has a first width transverse to its slot centerline in a region of said peripheral edge and a second width transverse to its slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, the second said width of said first type slots being greater than the first said width of said first type slots, and

each of said reentrant slots of said second type has a first width transverse to its slot centerline in a region of said peripheral edge and a second width transverse to its slot centerline in a region spaced inwardly, toward said deflector axis, relative to the region of said peripheral edge, the second said width of said second type slots being greater than the first said width of said second type slots.--

--95. (New) The early suppression fast response fire protection sprinkler of claim 93, wherein said first type length is equal to or greater than said second type length.--

--96. (New) The early suppression fast response fire protection sprinkler of claim 95, wherein said reentrant slot centerlines of said reentrant slots of said first type extend substantially radially outward from said deflector axis.--

--97. (New) The early suppression fast response fire protection sprinkler of claim 96, wherein said reentrant slot centerlines of said reentrant slots of said second type extend substantially radially outward from said deflector axis.--

--98. (New) The early suppression fast response fire protection sprinkler of claim 93, wherein said reentrant slots of said first type comprise at least two pairs of generally opposing reentrant slots.--